



Woodstove Changeout Workshop

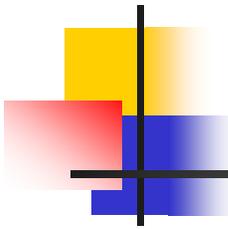
Nature and Magnitude of the Problem

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Nature and Magnitude of Residential Wood Smoke

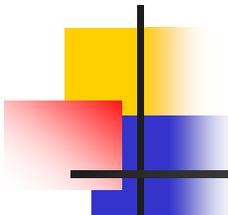
Presentation Purpose

- Provide overview of the following:
 - **Potential health effects**
 - **PM 2.5 emission inventory information**
 - **PM 2.5 source apportionment information**
 - **HAPs information**



What's in wood smoke?

- Benzene
- Toluene
- Formaldehyde
- Polycyclic organic matter
- CO, NO_x, and SO_x

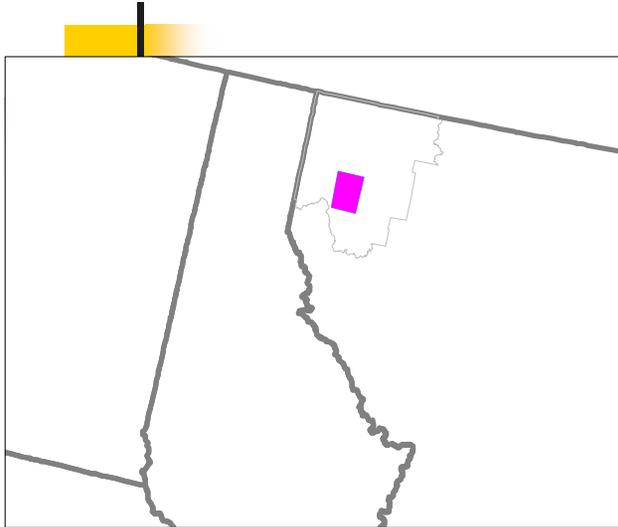


Residential Wood Smoke - Why do we care?

In 1997, EPA estimated that meeting the fine particle standards will prevent at least:

- 15,000 premature deaths;
- 75,000 cases of chronic bronchitis;
- 10,000 hospital admissions for respiratory and cardiovascular diseases;
- 20,000 cases of acute bronchitis;
- hundreds of thousands of occurrences of aggravated asthma; and
- 3.1 million days when people miss work because they are suffering from particle-related symptoms.

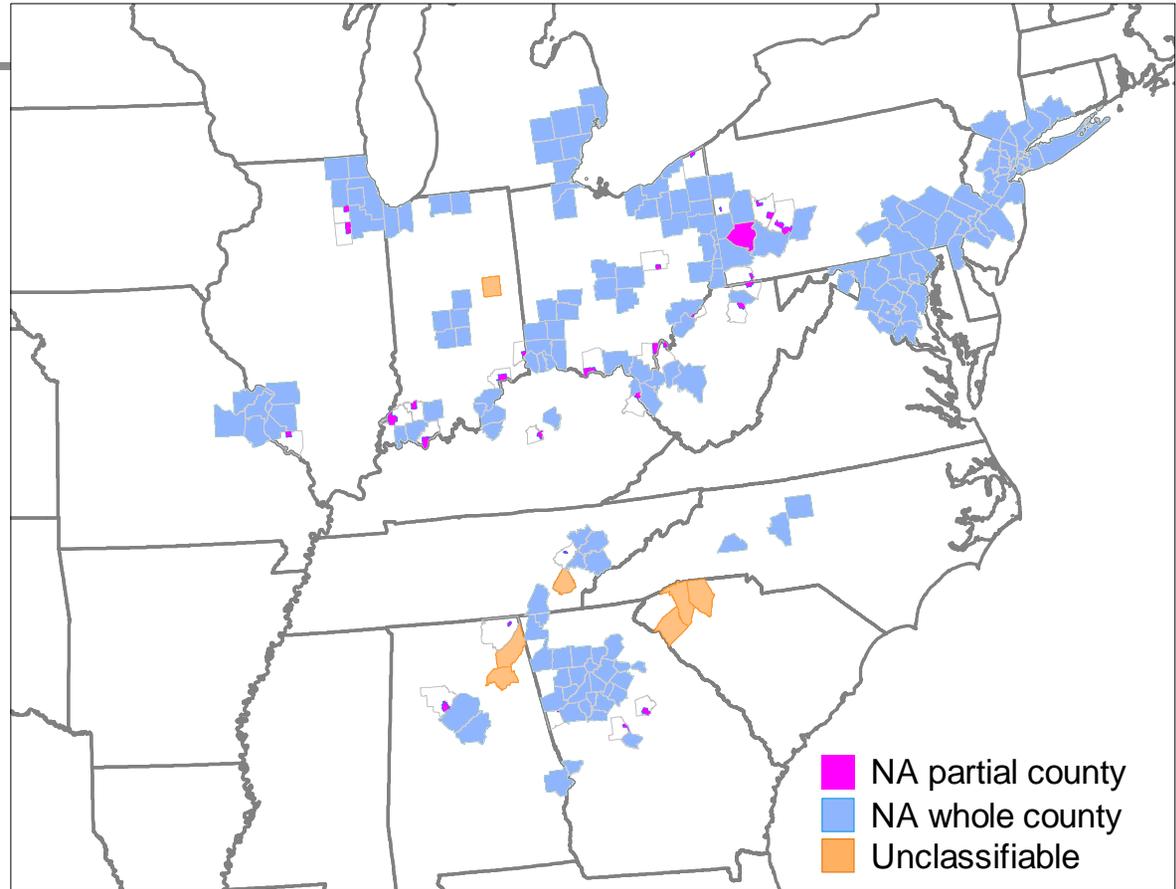
Final PM2.5 Nonattainment Areas



Montana



California



Eastern U.S.

- NA partial county
- NA whole county
- Unclassifiable



A Large Quantity of Emissions Distributed Over a Large Geographic Area

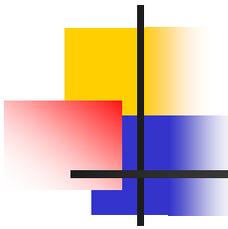
- **Fine particle pollution (PM_{2.5})** - ~6 % (420,000 tons) of total PM_{2.5} direct emissions
- 40-45 million wood burning appliances in U.S
- 15 million of those are wood stoves, either free standing or fireplace inserts
- 80% - 90% are pre-NSPS (prior to 1988)

Conventional Wood Stoves



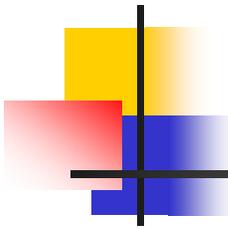
Advanced Wood Stoves (EPA Certified)





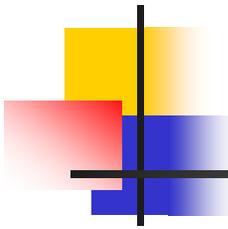
How many old stoves are in my locality?

- Not easy to say
- U.S. Census Data – American Housing Survey
- Market Research Firms
- State, local, tribal and other surveys



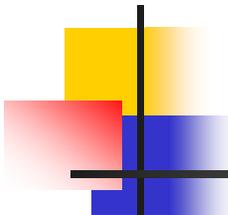
Potential for Local Exposures/Non-Attainment

- Occurs where people live
- Short “stacks”; poor dispersion
- Exposure may be higher per ton than from industrial sources
- Short term PM_{2.5} peak exposures are a concern in some areas
- Over 40 communities have burn bans



PM Source Apportionment Monitoring Data

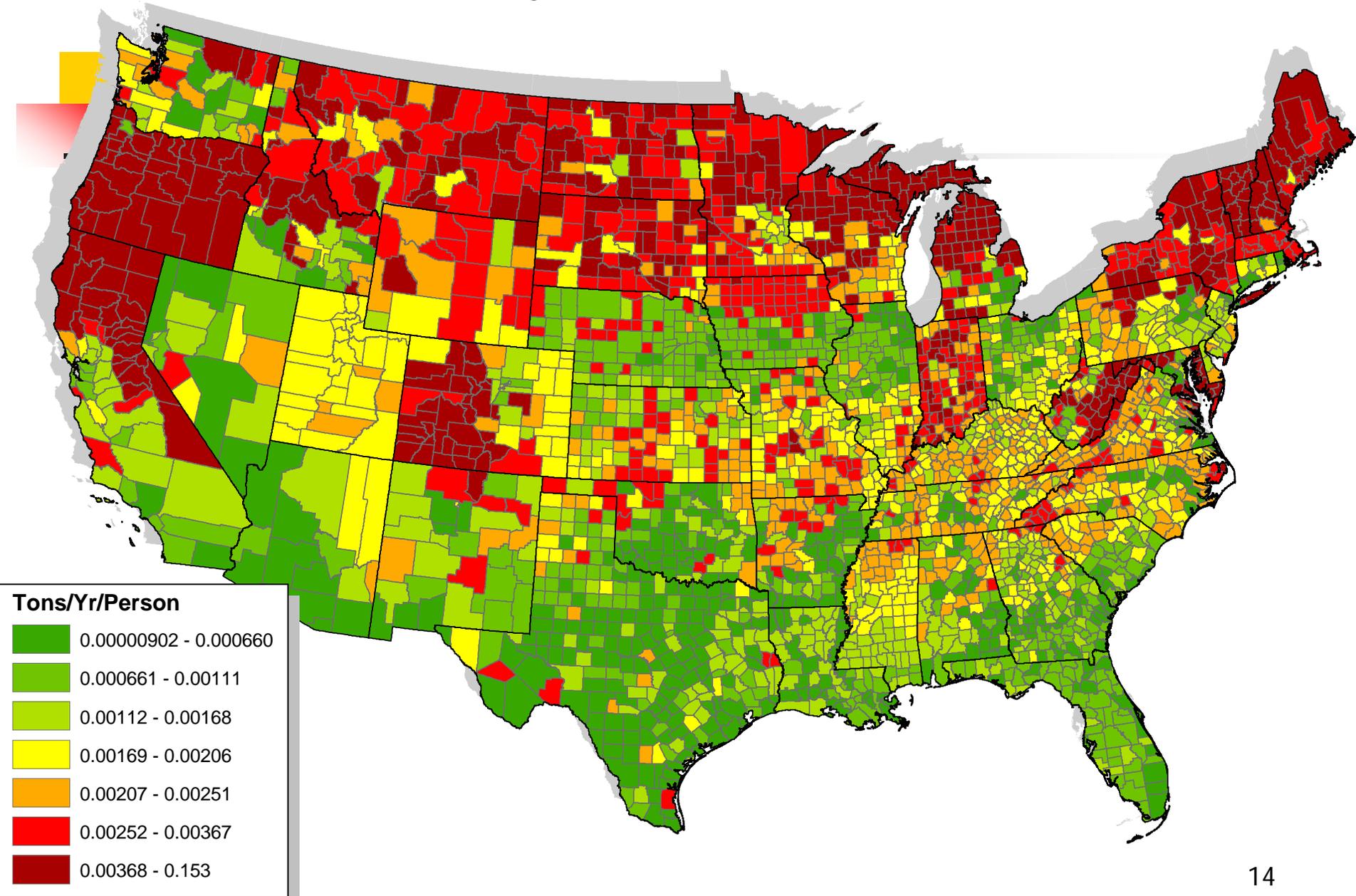
- In East, “biomass” burning is 0.3 - about 2 ug/m³
- Biomass includes wildfires and prescribed fires in addition to residential. Amount that is residential wood is uncertain
- More research is needed



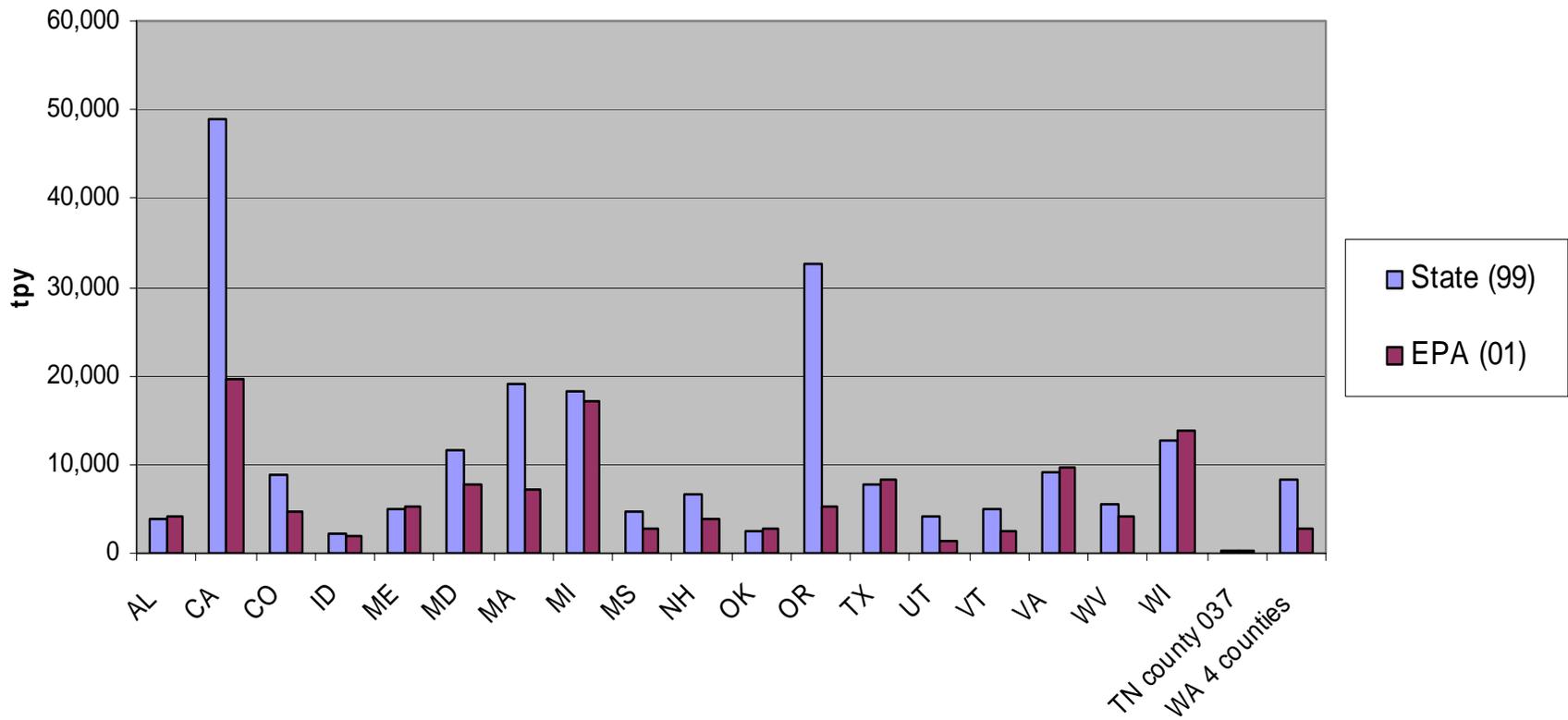
Reliability of Emissions Inventories and Projections

- The National Emission Inventory (NEI) is a mix of federally estimated data and state data
- The federal NEI estimates for RWC are derived from an estimate of wood consumed in the residential sector at the national level from the Department of Energy's Energy Information Administration (DOE/EIA)
- Estimates are more reliable at higher levels of aggregation than at the county level or lower

1999 PM2.5 Primary Emissions from Residential Wood Combustion

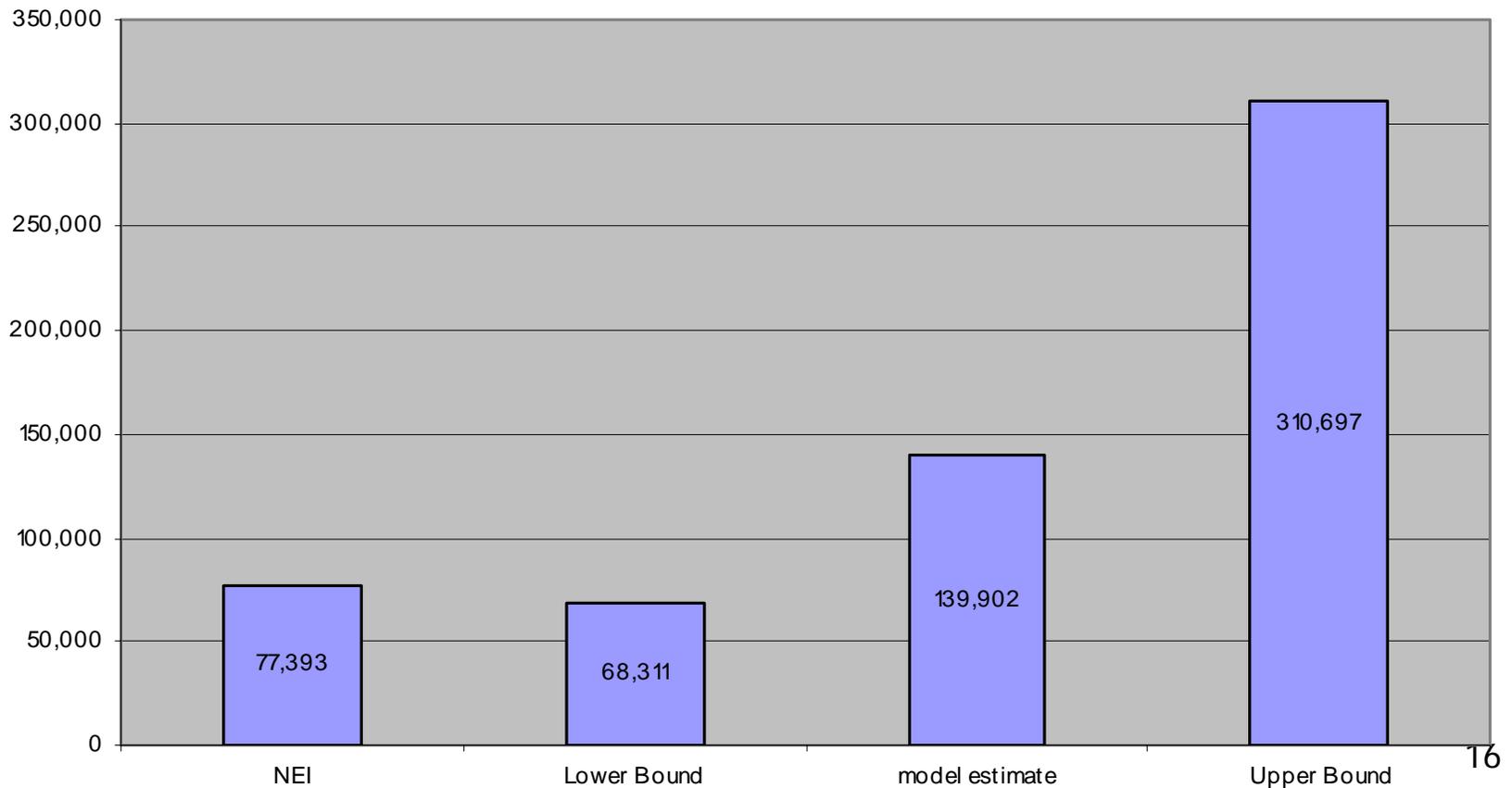


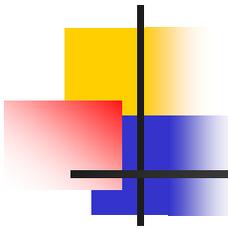
EPA and State PM2.5 Emission Inventory Estimates for Residential Wood Smoke



2004 MARAMA and NESCAUM Residential Wood Smoke Emission Estimates

PM2.5 Emissions From MARAMA & NESCAUM's Residential Wood Combustion Survey





Residential Wood Smoke

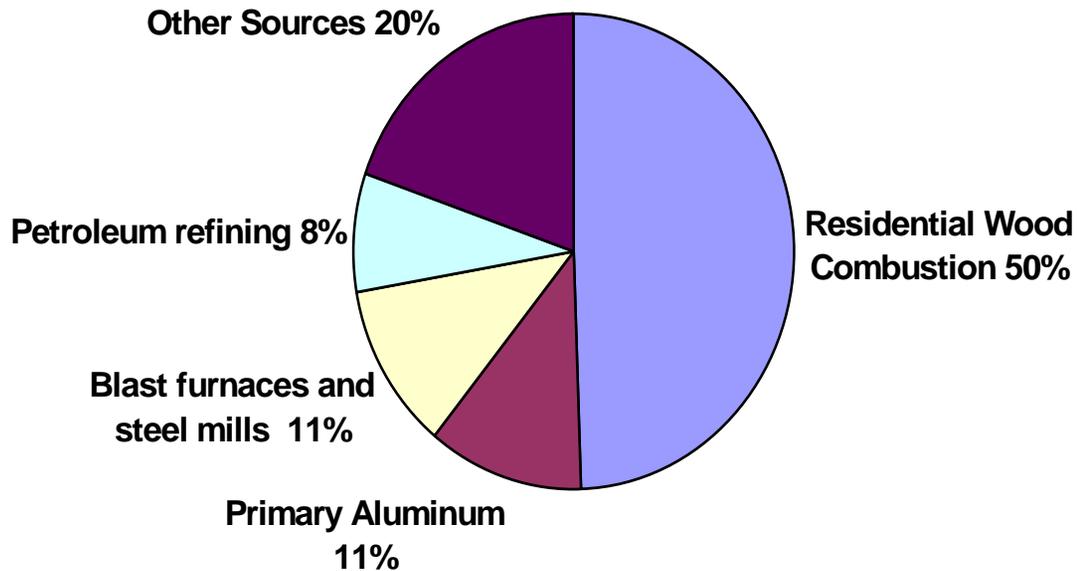
Why else do we care?

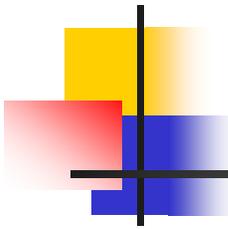
- **Toxics – Polycyclic Aromatic Hydrocarbons**
 - Contributes ~ 22% of all 7 carcinogenic PAHs, e.g., benzo(a)pyrene
- **Indoor Air**
 - Old wood stoves are often poorly sealed
 - Improper ventilation of woodstoves and fireplaces
 - Also, what's outside often comes inside via HVAC
- **Fire Safety**
 - Creosote build-up in chimney from old stoves is faster

Attachment F

% of Total Benzo(a) Pyrene (BaP) Emissions
in Great Lakes Area = 51,000 lbs.

1999 Data





Conclusion

- Residential wood smoke emissions are potentially a significant source of PM and toxics in numerous areas
- Questions/comments?

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